

A NEW SPECIES OF *PYURA* (ASCIDIACEA) FROM SOUTH VIETNAM

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ABSTRACT

Pyura camranica new species is described from South Vietnam. Some features are compared to several other species of *Pyura*.

The ascidian fauna of the Indo-Pacific is still not well known which is not unusual considering the vast tropical biodiversity of species. Although there have been a number of publications of ascidians from the Indo-Pacific region: China (Kott and Goodbody, 1982), Korea (Rho, 1971), Japan (Oka, 1906; Tokioka, 1949, 1950, 1952, 1953a, 1952b, 1955; Tokioka and Nishikawa, 1975; Nishikawa, 1980, 1990, 1991), Philippines (Van Name, 1918; Millar, 1975; Tokioka, 1970), North Australia (Kott, 1985, 1990); there have been only two previous publications on the ascidians from the Vietnamese coasts (Tokioka, 1967a and Vorontsova, 1992).

At one time, Nha Trang was second only to Saigon as the largest scientific center of French Indochina. In the early 1920's, several research institutes were established in Nha Trang. One such institute was the French-Indochina Oceanographic Institute which performed research on flora and fauna of the South China Sea. This institute has since been renamed The Marine Institute (Vien Bien) of The Vietnamese Academy of Science.

In the 1930's, Dr. K. Dawydoff of the French-Indochina Oceanographic Institute collected invertebrates from the vicinity of Nha Trang, Cam Ranh and other parts of the South China Sea. His collection of 53 ascidian species was given to Dr. V. Redikorzeff at the Zoological Institute of Leningrad, USSR for identification and the preliminary list of ascidians was included in Dawydoff's 1952 publication, "Contribution a l'etude des Invertebrés de la Faune Marine Benthique de l'Indochine."

The species described in our work is part of a collection of ascidians made by the senior author during a 2-year Vietnamese expedition from June 1989 through June 1991 at The Marine Department of the Soviet-Vietnamese Tropical Center in Nha Trang. The collecting was done near the coasts of islands and the mainland of Cam Ranh Peninsula and up toward and including Binh Cang Bay (Fig. 1).

The collecting of the species described in this work was done intertidally by snorkeling. The previous major ascidian collection from Vietnam was from deeper waters.

Five specimens were collected from South Vietnam at depths between 1.5–5 m. The holotype was collected from Tagne Island on 26 July 1990 from vertical rocky walls. Two of the paratypes were collected from Tam Island, one from Mot Island, and one from Cha La Island which was the largest specimen collected. Two of the paratypes were found within colonies of living coral and two were found on the undersides of dead tabular *Acropora* colonies.

All specimens were relaxed by refrigeration for 1 h and then fixed in solution of 4% formaldehyde and sea water. A list of the approximate 51 species of ascidians collected during this expedition is planned for publication in the near future.

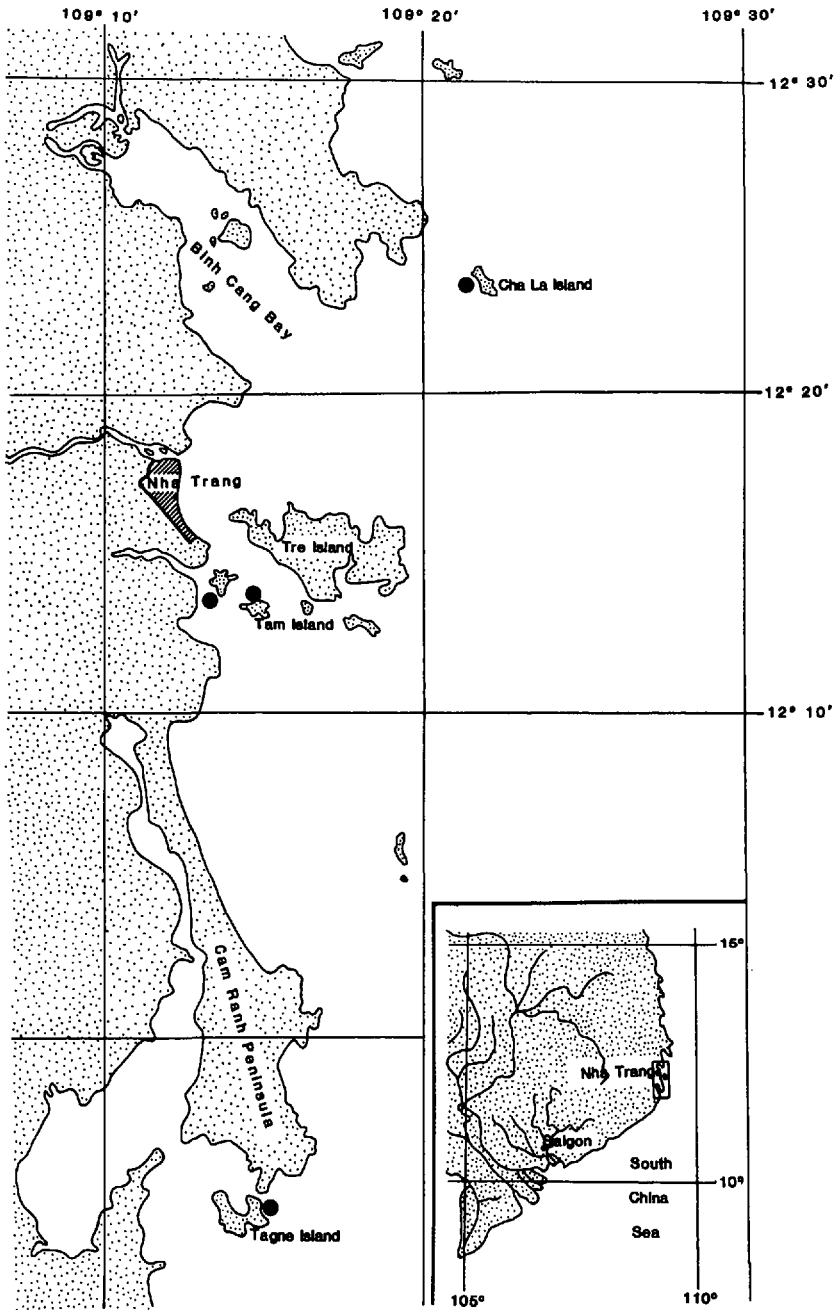


Figure 1. The location of the Nha Trang region in relation to South Indo-China. Localities (black dots) where type specimens of ascidian (*Pyura camranicum*) were collected.

A

B

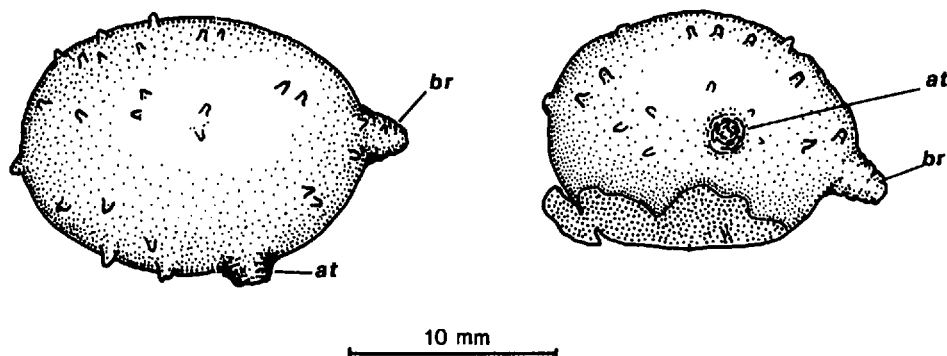


Figure 2. Lateral (A) and dorsal (B) views of *Pyura camranica* showing papillae on tunic.

Pyura camranica new species

Specimens Examined.—Holotype—In National Museum of Natural History, USNM 20074, Tagne Island, Cam Ranh Bay, South China Sea, Vietnam. Collected by Alexander Gogolev on 14 March 1990.

Paratype—In National Museum of Natural History, USNM 20075, Tam Island, Nha Trang Bay, South China Sea, Vietnam. Collected by Maria Vorontsova on 23 February 1990.

Paratype—In National Museum of Natural History, USNM 20076, Mot Island, Nha Trang Bay, South China Sea, Vietnam. Collected by Maria Vorontsova on 17 January 1990.

Paratype—In Zoological Museum of Moscow State University, Tam Island, Nha Trang Bay, South China Sea, Vietnam. Collected by Maria Vorontsova on 17 January 1990.

Paratype—In Zoological Museum of Moscow State University, Cha La Island (12°23'N, 109°22'E), South China Sea, Vietnam. Collected by Maria Vorontsova on 26 July 1990.

Description.—Animal oval shaped, flattened somewhat laterally and attached ventrally; specimens generally not very large, usually approximately 1–3 cm in length.

Color beige to brown. Smaller specimens form papillae on surface of tunic which are red in preserved specimens; tunic on older specimens rough and wrinkled.

Apertures (siphons) far apart with branchial aperture protruding; branchial aperture located on anterior most part of body and atrial aperture located in middle of right side of animal (Fig. 2). Branchial aperture has inside covering of tunic with characteristic red and white iridescent stripes. Upper half of siphonal lining has small cup-shaped spines, 20 μ m in length with opalescence (Fig. 3B, D). Spines arranged in rows (Fig. 3C).

18–22 tentacles of three different sizes located under siphonal sphincter muscle of branchial aperture (Fig. 3A) and are very simple pinnate form and tapering. Between tentacles in holotype are small papillae that might be under developed tentacles (Fig. 4A); these papillae are absent in the paratypes. Large dorsal tubercle has U-shaped slit, which was consistent in all specimens.

Muscle bands numerous and narrow and extend down length of both sides of body from siphons. Muscle bands extending from each siphon cross each other as they extend down length of body; ends of muscle bands split. On outside of both siphons are numerous closely placed circular muscle bands. Circular bands farthest from siphons are farther apart and stop just under siphons.

Branchial sac consists of 6 wide folds on left side and 7 on right with 3–5

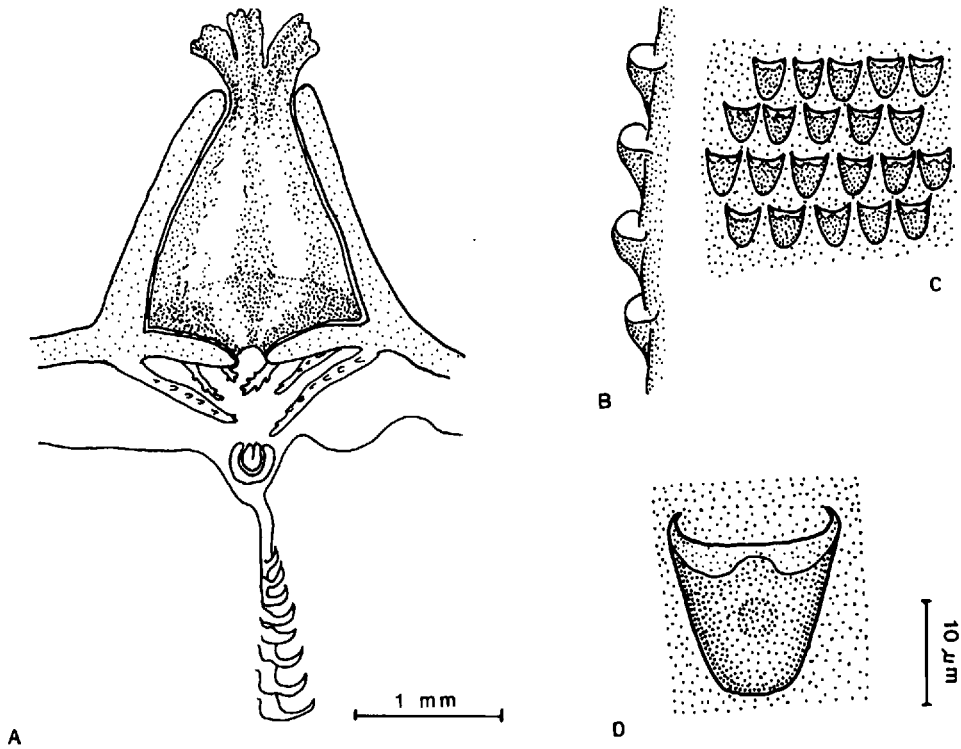


Figure 3. Branchial aperture (A) showing inside covering of tunic with stripes, siphonal sphincter muscle, tentacles, dorsal tubercle and languets on dorsal laminae. Lateral view of siphonal spines (B), frontal view showing rows of spines (C), individual spine (D).

stigmata per mesh. Internal longitudinal vessels in larger specimen have the following distribution: R end. 6 (10) 8 (18) 9 (21) 8 (23) 6 (24) 4 (22) 4 (20) 3 L D.L. 3 (16) 2 (17) 4 (17) 3 (21) 3 (26) 6 (18) 5 end. (Often it is difficult to determine whether vessels belong to the fold or the flat interval adjacent to the

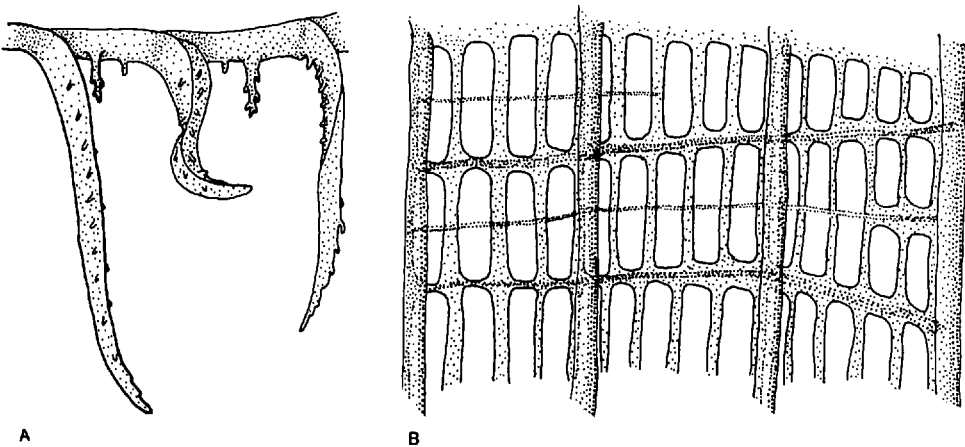


Figure 4. Tentacles (A) showing different sizes and papillae; branchial sac (B).

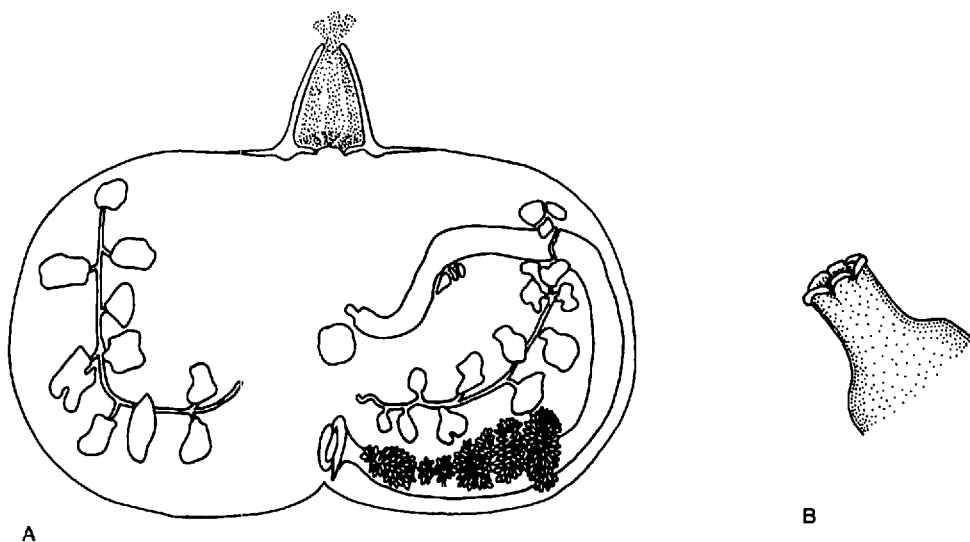


Figure 5. Dissected specimen (A) showing gut loop, hepatic gland, endocarps inside and outside of loop and gonads; rectum and anal margin (B).

fold.) Transverse vessels are of three sizes, smallest crossing part of stigmatal row. Degree of regularity in distribution of transverse vessels varies in different parts of branchial sac of same specimen (Fig. 4B). Posterior ends of longitudinal vessels of folds are tapered and frayed, sometimes curling upward. Dorsal lamina consists of long, curved languets that start just posterior to ganglion.

Digestive loop wide with an elongated stomach; stomach is of same width as intestine. Stomach wall smooth and transparent enough for lacunae on inside to be seen; lacunae, which are filled with a light brown substance, somewhat organized into longitudinal bands. Large hepatic gland (liver) located along dorsal part of stomach; it consists of several lobes; sometimes lobes separated by small spaces (Fig. 5A). In holotype small row of three endocarps located inside of gut loop and attached to intestines. Three endocarps on outside of loop attached to intestine near the constriction; constriction seems to divide intestine into two parts. Endocarps not found in paratypes. Rectum becomes more narrow toward anal opening (Fig. 5B). Anal margin has 5–6 slight lobes.

Gonads similar to those of *Pyura vittata*. Gonad on left side of body located inside of digestive loop. Paratype collected in July has full gonadal sacs and mature eggs in branchial sac; eggs seemed to be concentrated within folds. No larvae were found in any of specimens, which suggests that species may be viviparous. Holotype and paratypes collected between January and March had empty gonadal sacs which is unlike most species of ascidians from this area which generally breed between February and April.

Remarks.—The species described in the present work has characters that are similar to a number of other species of *Pyura*, but does not conform to the description of any particular species. The distinguishing characters of this species are: the red color of the papillae on the surface of the tunic of preserved specimens, the simple pinnate form of the tentacles, the red and white stripes inside of the branchial aperture with iridescent white stripes, the posterior ends of the longitudinal vessels of the folds that taper, fray and curl upward, the form of the hepaticum gland

(liver), and the constriction between the stomach and the intestine, which is the most characteristic feature and is not found in any other species of *Pyura*.

The species that is most similar to *P. camranica* is *P. shiinoi* (Tokiooka, 1949). Both species have subterminal branchial apertures and tentacles of very simple pinnate form. Both species also have similar gonads. However, upon examining the type specimen of *P. shiinoi*, the authors noted the following differences: the hepatic gland consists of two equally large lobes at both the anterior and posterior ends of the gland. In *P. camranica*, the lobe of the anterior end of the gland is much smaller than those of the posterior end (Fig. 5A). *P. shiinoi* has only one long slender endocarp on the inside of the gut loop as opposed to the row of three endocarps found in *P. camranica*. The rectum of *P. shiinoi* ends in a blunt point as opposed to the narrowing that was found in *P. camranica* (Fig. 5B).

P. elongata (Tokiooka, 1952 and Kott, 1985) has a similar siphonal sphincter muscle at the base of the siphon and the specimens examined by Millar, 1975 have the same simple pinnate form of tentacles. The type specimen is no longer in the collection of the Seto Marine Biological Laboratory (Teruaki Nishikawa), however, a number of non-type specimens of this species from various localities in South Vietnam were examined and compared to *P. camranica*. None had the constriction along the intestine or endocarps inside or outside of the intestine.

P. subuculata (Sluiter, 1900) Tokiooka, 1950 has the same simple pinnate tentacles.

P. pantex Hartmeyer and Michaelsen, 1928 has a similar siphonal sphincter muscle and has a wide gut loop (Kott, 1985) that is similar to that of *P. camranica*, but all other features are different. *P. amboensis* Millar, 1975 also has the siphonal sphincter muscle displayed by *P. camranica*.

There are several species that possess the iridescence on the inner surface of the branchial aperture: *P. curvigona* Tokiooka (1967b; Millar, 1975), *P. karasboja* (Oka, 1906), *P. torpida* (Sluiter, 1898), and *P. albanyensis* Michaelsen and Hartmeyer, 1927 (Monniot, 1989); but the other features in each of these species are quite different from those of *P. camranica*.

The siphonal spines of *P. camranica* are most similar to those of *P. viarecta* Kott, 1985 and *P. confragosa* Kott, 1985. As mentioned by Kott (1985), the iridescence is usually found in species with long, needle-like spines and not in species with the cup shaped spines of *P. camranica*.

The form of the gonads of our new species resembles gonads of *P. vittata*. Empty gonadal sacs in some of the specimens of *P. camranica* resemble endocarps, as do empty gonadal sacs of *P. vittata* (Van Name, 1945).

Kott (1985) divided the species of *Pyura* into three groups: Pachydermatina, Irregularis, and Obesa. According to this grouping, *P. camranica* does not seem to be typical. It seems to fit into the Irregularis group, rather than the Obesa group where the typical tropical *Pyura* species are placed. Most of the species of the Irregularis group inhabit temperate waters with only a small number of species of this group inhabiting tropical waters (Kott, 1985).

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